Department of Energy (DOE) Fire Safety Committee

Minutes of the June 23, 2004 meeting

Written by: Jim Bisker, Chairman

The meeting was held at the Berkner Hall (Bldg. 488) in conjunction with the Year 2005 DOE/Contractor Fire Safety Workshop (hosted by Brookhaven National Laboratory, Upton, New York).

Fire Data Collection and Analysis initiative

At the CY – 2004 workshop a subcommittee was formed to evaluate fire protection reporting requirements of DOE M 231.1-1A. The results of this evaluation were presented to the workshop attendees (William Boyce presentation titled: Data for Annual fire protection Summary. In this committee meeting however, certain business relating to the initiative was discussed, such as the reporting of fire protection system impairments. Committee members present ultimately tasked the subcommittee to finalize its report to Frank Russo, Deputy Assistant Secretary for Corporate Performance Assessment (EH-3) to complete his commitment to the DNFSB (see Attachment 1). The extent of the subcommittee's report will center on the recommendation to incorporate NFIRS-based reporting into the Order as well as other revisions necessary to appropriately quantify certain program attributes on either an annual or ad hoc basis. A copy this report is included as (Attachment 3)

Status of the Facility Safety Order (DOE O 420.1B) Revisions

The Committee chairman provided a status on the Facility Safety Order revision (DOE O 420.1 B). At present, comments submitted to REVCOM have been incorporated and the Order will be re-posted in early July for concurrence. Major aspects of the order revision were presented to the attendees where there was some discussion on intent and substance in certain sections. It was agreed that an additional review copy would be made available to committee members for their comments prior to the REVCOM posting (see attached file).

Status of the Facility Safety Order Implementation Guide (DOE G 440.1-5) and the Fire Protection Design Criteria (DOE-STD-1066) Revisions

In anticipation of DOE publishing an acceptable version of DOE 420.1B the next step is to update the Implementation Guide. The Committee Chairman identified that this revision should begin later this summer with the transmittal of a straw man copy to Committee members to start the process. Members were encouraged to e-mail any input that they would like to see in this straw man document. After this document is published, then the Committee will be tasked with revising the Fire Protection Design Criteria (DOE–STD-1066).

Dennis Kubicki also notes the following"

Although Jim didn't mention it explicitly in the fire safety committee meeting "minutes," we will be revising Chapter 6, "Fire Department Operations," of the Implementation Guide to DOE Order 420.1. I volunteered to develop a revised draft, with (hopefully) your help. For those of you who haven't looked at the text in quite awhile, the Implementation Guide can be found here.

http://www.eh.doe.gov/fire/guidelines.html#guidance (4th item down from the top)

Note that the text is fairly "lean" with regard to emergency services. I suggest that we may want to make Chapter 6 more expansive, to address a broader array of issues.

I'll begin drafting language the week of July 18th. If you want to take some time and review the current Chapter 6, I would welcome any general suggestions for enhancements.

For example, how do we want to approach the issue of fire department self assessments? (This is required by DOE O 420.1, NFPA 1710 and the draft 851 rule.)

Or, what do we do with the existing DOE implementation guidance for NFPA Standards, 1500, 1583, and 1710?

I'll forward the first draft to all of you when it's complete.

Regards,

Dennis

DNFSB Recommendation 2004-1

A recent initiative was launched by EH 2-2 to develop a DOE Assessment Oversight Manual as promised in commitment No. 5 to DNFSB Recommendation 2004-1. This document includes a Fire Protection Criteria Review Approach Document that will be drafted by Dennis Kubicki and made available to Committee members for review. A copy of the current draft is included as Attachment 2

For additional information on these minutes or the DOE Fire Safety Committee, please contact Jim Bisker on (301) 903-654 (jim.bisker@eh.doe.gov).

Attachment 1

[DOE LETTERHEAD]

March 30, 2005

Mr. John T. Conway, Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW
Suite 700
Washington, D.C. 20004-2901

Dear Mr. Chairman:

The purpose of this letter is to provide you with an update of our plans to reevaluate fire safety performance measures and reporting methodology. This is consistent with previous commitments delineated in my letter to you on October 18, 2004, and in a meeting with your fire protection staff on November 10, 2004.

Since our meeting with your staff, the subcommittee (of the Department of Energy Fire Safety Committee) that was tasked with addressing this issue has completed an evaluation of all fire reporting criteria currently stipulated in Department of Energy (DOE) Manual 231.1-1A**,** National Fire Protection Association Standard 901**,** and the National Fire Incident Reporting System (NFIRS), as well as criteria used by several DOE sites. Pending is an effort to segregate the criteria into lists for various repositories and eliminate duplication.

In conjunction with these actions, a pilot project was initiated to enable DOE fire departments to begin entering emergency response data on a voluntary basis into the NFIRS system. While a significant number of sites have expressed interest in the pilot, only one fire department has begun to participate. Others await the resolution of issues associated with computer software compatibility, release of sensitive information, and obtaining appropriate approvals before data entry can begin. The subcommittee believes that it will require at least one year to evaluate the success of the pilot, conditional upon the participation of a representative number of departments.

On January 31, 2005, the subcommittee sent an interim progress report to the DOE Fire Safety Committee and points-of-contact for the mandated annual fire protection program summary. At that same time a request was made from all sites for additional data fields and performance elements for consideration. No additional input has been received as of this date.

In a related issue, it has been noted through Fire Safety Committee discussions and program office oversight activities that accurate reporting of fire and related events in the Occurrence Reporting and Processing System and the Computerized Accident/Incident

Reporting System is being obscured by imprecise definitions. Some sites use terms such as; "thermal excursions," "exothermic reactions," "rapid deflagrations," and other names in lieu "fire". The subcommittee has developed an all-encompassing definition of "fire" to be used in all DOE reporting systems. An effort is currently underway to revise the DOE directives that govern these systems to include this new definition. This is being done with the expectation that the accuracy of future fire reporting will be enhanced.

The subcommittee has completed most of the work to identify and evaluate fire reporting criteria. It plans to issue a preliminary report during the 2005 DOE Fire Safety Workshop which is tentatively scheduled for the week of June 15th at Brookhaven National Laboratory and a final report shortly thereafter. A strawman draft of this report is enclosed for your information. Following the completion of the pilot project, revisions to current DOE fire protection program performance measures and incident reporting systems, will be coordinated with the DOE Fire Safety Committee and the Defense Nuclear Facilities Safety Board (DNFSB) staff.

Consistent with current practice, the DNFSB staff will be kept informed of progress during the periodically scheduled teleconferences of the subcommittee. (Mr. Chuck March of your staff has been a regular participant.)

If you have any questions, please contact me at (202) 586-6151 or members of your staff may contact Mr. Frank Russo at (301) 903-8008.

Sincerely,

John Spitaleri Shaw
Assistant Secretary for
Environment, Safety and Health

Enclosure

cc w/enclosure:
Linton F. Brooks, NA-1
Raymond L. Orbach, SC-1
James J. Mangeno, NA-3.6
Patrice Bubar, EM-3.2
Lawrence O. Bailey, EM-3

Attachment 2

TITLE: FIRE SAFETY AND EMERGENCY SERVICES PROGRAM

FUNCTIONAL AREA GOALS:

- The potential for unwanted fires and related events is minimized, and
- There will be no fire that causes a loss of life or serious injury, and
- There will be no fire that causes an unacceptable release of hazardous or radiological materials, and
- *No vital DOE program will suffer an unacceptable interruption as a result of a fire or its effects, and*
- *Property losses from fires and its effects will be minimized, and*
- Critical process controls and safety systems will remain free of fire and smoke damage, and
- Sites will have access to a fully capable emergency services organization (fire department or equivalent) that can respond in a timely and effective manner to fires, medical incidents and other emergency situations, and
- Site fire safety and emergency services programs will conform to applicable federal regulations, industry standards and DOE fire safety directives, unless documented relief has been granted by the DOE authority having jurisdiction (AHJ) for fire safety.

TOPICAL AREA: Fire Safety and Emergency Services

Requirements:

- 29 CFR 1910, Subpart E, *Means of Egress*
- 29 CFR 1910, Subpart L, *Fire Protection*
- 29 CFR 1926, *Safety and Health Regulations for Construction*
- DOE O 420.1B, *Facility Safety*: Chapter II, *Fire Protection*
- DOE O 440.1, *Worker Protection Management for Federal and Contractor Employees*
- Site and facility SRIDs, DSAs, TSRs, and related requirements

Guidance:

- DOE G-420.1B-0; *Implementation Guide for use with DOE Order 420.1 and 440.1 Fire Safety Program*
- DOE STD-1066-99, *Fire Protection Design Criteria*
- DOE STD-1088-95, *Fire Protection for Relocatable Structures*
- DOE HDBK-1081-94, *Primer on Spontaneous Heating and Pyrophoricity*
- Factory Mutual Loss Prevention Data Sheets
- National Fire Protection Association Handbook
- Society of Fire Protection Engineers Handbook

PERFORMANCE OBJECTIVE FP.1

The site (or facility) is governed by an up-to-date, comprehensive, documented fire safety program.

Criteria:

FP.1-1 A documented fire safety program exists as required by DOE Order 420.1.

- The elements of the fire protection engineering program can be found in a fire protection program manual (or equivalent documents).
- The facets of the site emergency services program are delineated in fire department/brigade operating procedures and equivalent documents.
- Fire safety and emergency services roles and responsibilities are clearly delineated.
- Site (or facility) organizational and physical changes (such as fire protection upgrades) that have occurred within the past few years have been reflected in the (fire safety) program documentation.
- Auditable training records exist for the fire safety staff (including emergency responders).
- Appropriate procedures and records are available which encompass the inspection, testing and maintenance of fire protection systems.
- A file(s) exists which contains the documented resolution of all significant fire safety issues related to new construction projects.

FP.1-2 The fire safety program document addresses all of the essential elements of a comprehensive fire protection program as delineated in DOE Order 420.1, "Facility Safety," and the Implementation Guide to DOE O 420.1, "Fire Protection Program."

- Applicable regulations, DOE fire safety directives, and industry standards (such as applicable NFPA standards) have been incorporated into the program.
- Site-specific policies and practices have been implemented where DOE directives and industry standards may be insufficient to mitigate risk.
- Comprehensive written agreements exist with off-site organizations that have roles and responsibilities for site fire safety.
- A complete set of fire protection and emergency services "performance measures" have been adopted.
- An effective issues tracking system has been institutionalized, which encompasses all significant fire safety issues and complies with DOE O 414.1A, “Quality Assurance.” This system should include a means to prioritize issues, to allocate funding on the basis of these priorities, and to implement "interim compensatory measures" when there will be a significant delay with the implementation of corrective measures.

FP.1-3 The fire protection program applies to leases and to the activities of subcontractors to the extent that they involve operations that pose a risk to the public, site workers, DOE programs, and Government facilities as required by DOE Orders 420.1 and 440.1.

- *Appropriate clauses related to fire safety are incorporated into contracts governing activities that represent a significant fire risk.*
- *Lease agreements for buildings in which DOE employees, assets, or program activities will be housed contain appropriate language governing fire protection.*

PERFORMANCE OBJECTIVE FP.2

Fire and related safety hazards on site (or within the facility) have been identified and evaluated in conjunction with a current and comprehensive fire hazards analysis (FHA) and self-assessment.

Criteria:

FP.2-1 Current FHAs and facility (fire protection) self-assessments have been performed for all applicable facilities and other locations as required by DOE 420.1.

- All facilities for which FHAs and fire safety self-assessments are required have been identified.
- A site program exists governing the periodic updating of these documents.
- FHAs and assessments are current as compared to the established schedule.
- FHAs and fire safety assessments have been performed for external areas (storage yards, substations, restricted/contaminated areas).

FP.2-2 The FHA and self-assessments address all essential elements for a complete analysis as delineated in DOE 420.1 and its Implementation Guide.

- The documents contain a complete description of the facility, including process operations and related hazards.
- The FHAs and assessments include a textual description of credible fire scenarios, including those involving radiological and chemical hazards.
- The documents identify external fire exposures and evaluate the potential for fire and smoke spread from one (fire) area to another within the facility. The potential for external smoke damage to safety systems and equipment (such as diesel generator intakes) has been evaluated.
- The FHAs and assessments describe the spectrum of fire prevention and protection features in relation to their ability to control fire and reduce risk.
- The documents identify significant variances from DOE directives and NFPA standards, to the extent that they adversely affect fire safety.

- The FHAs comprehensively describe and evaluate the intervention by site (and/or off-site) emergency services organizations.

FP.2-3 The information contained in the FHA and assessment is accurate, as required by NFPA Standard 801, determined by a walk-down of the facility.

- The information represented in typical FHAs and self-assessment was confirmed by a facility tour as part of the assessment.
- Noted inconsistences in the site FHAs and self-assessment are not significant.
- The site USQD process has been applied adequately with regard to fire safety issues that have arisen.

FP.2-4 Fire modeling or other analytical tools used in the assessment of (fire) risk are appropriate, validated and reach conservative conclusions as required by DOE Order 420.1 and NFPA Standard 801

- Fire models used have been subjected to an (evaluation) process that verifies their validity for the given situation.
- The models have been applied by experienced and qualified fire protection engineers.
- Risk assessment techniques are not utilized to reduce defense-in-depth.
- All assumptions and technical bases for the use of fire models have been identified and justified.
- Bracketing calculations for given fire scenarios are provided to validate conclusions regarding bounding results of the analyses.
- Quantitative analyses results are not used as the sole basis for deciding levels of fire protection.

PERFORMANCE OBJECTIVE FP.3

Fire prevention procedures have been implemented and fire safety features have been installed to mitigate fire risk.

Criteria:

FP.3-1 A complete spectrum of fire prevention controls and procedures are in existence and have been implemented as required by *29 CFR 1910* and DOE Order 420.1.

- Fire safety "defense-in-depth" exists across the site and encompasses all significant facilities and activities for which fires and related hazards represent a credible threat.
- Fire and related hazards that are unique to DOE and are not addressed by industry standards are protected by isolation, segregation or special fire control systems (e.g. inert gas, explosion suppression).

- Passive fire safety features (such as fire walls or “defensible areas” around facilities and utilities) are favored over active systems. Engineering and design controls are favored over administrative controls.
- Fire prevention procedures, fire protection systems, and manual fire fighting capabilities have been confirmed by representative "vertical slice" reviews.

FP.3-2 All fixed fire protection features (appropriate construction types, fire barriers, fire alarm and signaling systems, manual and automatic fire suppression systems, etc.), that are required by authorization basis documents and fire hazards analyses, have been installed, as required by DOE Order 420.1.

- Required fire safety features have been confirmed in comparison with authorization basis documents, FHAs, DOE directives, and NFPA standards.
- Fire protection features have been appropriately classified as "essential," "important to safety," and "defense in depth."
- Fire protection systems are designed, installed and maintained such that their inadvertent operation, inactivation, or failure of structural stability will not result in the loss of vital safety functions, inoperability of safety class systems, or personal injury

FP.3-3 A process exists to assure that all fire prevention and protection features are reviewed and approved by a qualified fire protection engineer as required by DOE Order 420.1.

- The site has a program in place governing the review of construction project design packages by a qualified fire protection engineer.
- Projects cannot proceed without the (signature) approval of the cognizant fire protection engineer.
- The DOE field office and program office fire protection staffs are involved with the approval of significant projects involving fire safety.

FP.3-4 Applicable industry standards (NFPA, ASTM, etc.) were used in the design, installation and testing of the fire protection features, as required by DOE Order 420.1 and NFPA 801.

- The utilization of industry standards was confirmed by a select review of construction plans and specifications, authorization bases documents, and self-assessment reports.
- Conformance with industry standards was confirmed on the basis of facility tours.
- Fire protection system inspection, testing and maintenance programs (scope and frequencies) conform to NFPA 25 and 72, as amended by DOE Implementation Guidance.

- A QA/QC program on site, which complies with DOE O 414.1A, governs the specification, purchase, inspection, acceptance-testing, and maintenance of fire protection components and systems.

PERFORMANCE OBJECTIVE FP.4

Personnel are appropriately qualified and trained to perform their work safely and responsibly when confronted by fire hazards and related dangers.

Criteria:

FP.4-1 All employees receive an applicable level of "general" training in (fire) hazard recognition, appropriate safeguards and emergency response as required by 29 CFR 1910.38 and NFPA 1.

- A program exists on site, which provides all employees with an appropriate level of fire safety training upon initial employment and on a regular follow-on basis.
- Appropriate fire safety training is provided to subcontractors who perform work involving significant fire risk.

FP.4-2 Employees exposed to "special" fire hazards are provided with appropriate initial training and "refresher" training as required by 29 CFR 1910 and DOE Order 420.1.

- A documented program exists which identifies which employees are subjected to fire safety hazards that represent a unique risk.
- Appropriate training is available to employees who have been identified as needing special fire safety training (such as fire fighters, first responders, cutters, welders, and fire watchers, among others)
- Special fire safety training has been reviewed by a qualified fire safety specialist (such as a fire protection engineer of fire department safety officer) and has been presented by an individual with more than a rudimentary level of knowledge of the risks involved.

FP.4-3 The fire safety staff (engineers, technicians, fire fighters, managers) are appropriately educated, trained and certified as required by 29 CFR 1910 and DOE Order 360.1.

- The staff is encompassed by a professional development or comparable program.
- During a given year, the staff has received an appropriate level of continuing education and training in accordance with their individual needs.

PERFORMANCE OBJECTIVE FP.5

The site (or facility) is protected by a fully capable emergency services organization.

Criteria:

FP.5-1 A current "baseline needs assessment" (BNA) or equivalent document has been performed for the emergency services organization in accordance with DOE 420.1.

- The fire department (or fire brigade) has comprehensively defined its roles and responsibilities for site emergency services.
- Off-site emergency response obligations are defined in a "mutual aid" agreement or equivalent document.
- Collateral duty roles and responsibilities have been identified and justified.
- The mobile apparatus inventory is sufficient for anticipated site emergencies, with appropriate reserve capability.
- Fire department (or brigade) staffing levels have been evaluated, defined and met.
- Emergency equipment inventories are complete.
- *Fire department facilities (stations) are designed, constructed and maintained in a manner sufficient to accommodate personnel, apparatus, equipment and program responsibilities (e.g. housing, training, maintenance and storage).*
- The site fire alarm, signaling system and emergency radio communications capability is reliable and effective.
- A clear line of responsibility exists between the fire department/brigade and other site organizations that may also respond to an emergency.
- Run statistics are complete and current.
- Fire department representatives are represented on facility design reviews and the development of authorization basis documentation.

FP.5-2 The fire department (or fire brigade) conforms to applicable CFR requirements and NFPA codes and standards.

- The fire department (or brigade) has developed pre-fire plans for all significant facilities and areas on site.
- A complete set of written standard operating procedures (or equivalent) exists which govern the activities of the fire department (or brigade).
- The fire fighter training program is complete and current.
- Emergency response apparatus and equipment are within acceptable service lives.
- Apparatus and equipment are inspected, tested, and maintained in accordance with an established schedule.

- The emergency services organization effectively implements the "Incident Command System."
- Fire prevention inspections are being performed in accordance with established frequencies.
- Fire department/brigade personnel meet required levels of competency and certification.
- *A fire department/brigade safety and health program has been implemented per the requirements of NFPA Standards 1500/600.*

FP.5-3 In the absence of a site fire department or in the event of need, an adequate level of emergency services can be obtained through off site organizations.

- The site has defined its emergency services needs in relation to off-site fire departments and related organizations.
- Appropriate agreements (MOUs, fees for services, etc.) are in place between the site and off-site emergency responders.
- Site familiarization tours (including hazardous and radiologically contaminated areas) and related training are performed routinely by responsible off-site emergency services organizations.
- Off-site emergency responders comply with all site-specific training requirements so as to be able to respond safely and effectively to site emergencies.
- Plans for extended operations, radiological monitoring, and personnel accountability have been developed and practiced.

PERFORMANCE OBJECTIVE FP.6

Data, statistics, "lessons learned" and other "feedback" from the site (or facility) fire safety program are disseminated on site and within the DOE (fire) safety community.

Criteria:

FP.6-1 Performance data and statistics related to the fire protection program are collected and reported in accordance with DOE Order 231.1 and 232.1.

- Fire safety data and statistics are accurately and consistently documented and reported as part of the required annual summary of the fire protection program.
- Fires and related events are accurately and consistently documented via the CAIRS and ORPS systems, as applicable.

FP.6-2 Fire safety-related "near misses" and "lessons learned" are routinely disseminated internally to the DOE community, as directed in the May 1998 Secretarial Memorandum on Fire Safety Programs.

- Site-specific documentation is available to confirm that small fires and other related occurrences are distributed within the contractor organization as "near misses."

- Documentation or other information exists to verify that the DOE field office and program office are informed of fire safety-related "near misses" and related information on a regular basis.
- The DOE "lessons learned" program is utilized to distribute information on fires and related events that may have relevance elsewhere within the Complex.

APPROACH:

Document Review:
Contract/lease provisions that are relevant to fire safety; fire protection program description(s); representative authorization basis documents; representative fire hazards analysis; recent ORPS/CAIRS reports; select facility fire safety assessment reports; assessment finding status reports; fire department Baseline Needs Assessment; fire department self assessment report; fire department standard operating procedures; fire department run statistics; fire protection system inspection, testing and maintenance records; fire safety staff training records and personnel qualifications; fire safety equivalencies and exemptions.

Interviews:
Line managers, fire protection program manager(s), fire chief and battalion chiefs, fire protection engineers, fire fighters, technicians responsible for fire system testing and maintenance, collective bargaining representatives, select employees (interviewed at random).

Site/facility Tours:
Diverse and representative facilities if a site wide assessment is performed. Complete walk down of individual facilities where there is a facility-specific focus.

Observations:
None.

Attachment 3

7/7/05

DOE FIRE SAFETY COMMITTEE RECOMMENDATIONS ON FIRE REPORTING CRITERIA.

INTRODUCTION: At a meeting of the DOE Fire Safety Committee in June, 2004, a subcommittee was appointed to re-evaluate and recommend improvements to the DOE fire safety reporting criteria. This was in response to a commitment to the Defense Nuclear Facility Safety Board following completion of the report by the Secretarial Commission on Fire Safety and Preparedness. The subcommittee consisted of the following members:
Jim Bisker, EH
Bill Boyce, EM (Lead)
Bruce Campbell, RFETS
Craig Christenson, RL
Chief Scott Hackler, Y-12
Jim Hutton, Y-12
Chief John Searing, BNL
Chief Gurney Wiggins, SRS

SUMMARY: The subcommittee evaluated the data currently required by DOE Manual 231.1-1A and found that many data elements were not being utilized and the remaining data fields did not capture all essential aspects of fire protection performance. To fill the gaps, the subcommittee looked at NFPA 901, *Standard Classifications for Incident Reporting and Fire Protection Data*, the National Fire Incident Reporting System (NFIRS), optional measures in DOE Manual 231.1-1A, and site performance data. In all, about 800 potential data elements were considered. From these a number of additional fields are being recommended The subcommittee also evaluated methods of collecting the data and initiated a pilot through the Navy Safety Center to test the use of NFIRS as a collection mechanism. Retrieval of data from NFIRS would allow a large reduction in direct reporting to DOE HQ. In addition, the subcommittee examined HQ handling and analysis of the data and made several recommendations on reporting, analysis, and funding by HQ.

The subcommittee found one significant flaw in the reporting. DOE M 231.1-1A requires reporting all fire events. Some sites are screening fire reports and sending only those that are significant. Unlike ORPS, and formerly CAIRS, there is no minimum threshold for reportable fires for the Annual Summary.

At a meeting of the DOE Fire Safety Committee on June 15, 2005, the full committee concurred with the direction being taken by the subcommittee and decided to proceed with an NFIRS-based emergency response reporting system.

METHODOLOGY: The subcommittee listed all data elements from the current manual, DOE M 231.1-1A, as well as NFIRS, NFPA 901, and performance data suggested by the sites. Optional performance measures listed in Table F-2 of DOE M 231.1-1A were also examined but not added to the list because the subcommittee felt that a "yes" or "no" report on performance from the field elements would not adequately support data trending and analysis. However, a number of the performance measures in Table F-2 represent important issues and the subcommittee decided to break them down into component parts that could be used to measure performance. For example, a performance measure in Table F-2 reading "Fire Hazards analyses/fire protection program assessment reports are complete and current" would require a "yes" or "no" response from the field. As an alternative, the subcommittee recommends separate data fields for # of Fire Hazard Analyses (FHAs) required, # FHAs current, # facility fire assessments (FFAs) required, # FFAs current, as well as dates of last program assessment and self assessment by both DOE and the contractors. From this data, the degree of compliance can be determined and trends can be monitored. Approximately 800 elements were considered. The list was separated into two groups. The first consists of data that is currently used at HQ or has the potential to be used. All other data elements were moved to another group that should no longer be required to be sent to HQ on an annual basis but may be needed locally, for special studies, or to respond to inquiries.

NFIRS PILOT: The US Fire Administration, a part of FEMA, compiles a national database of fire department emergency response data through the National Fire Incident Reporting System (NFIRS). USFA works through state programs that establish participation requirements for all fire departments in the state. Participation is not mandatory but 42 states participate and many DOE site contractors submit data through their states. DOE has been considering use of NFIRS as a data collection mechanism for a number of years. NFIRS is based on NFPA 901 which is part of the National Fire Codes required by DOE directives so even nonparticipating sites should be familiar with the concepts. Since the NFIRS data belongs to the states, coordination to identify and retrieve DOE incidents would be cumbersome, especially if DOE elects to modify the data fields. The Department of Defense (DOD) already uses NFIRS. They overcame state-by-state coordination issues by establishing DOD as a "state" within the NFIRS database and requiring all DOD elements to report to the state of DD. At the invitation of the Navy Safety Center, which operates the NFIRS program for DOD, the subcommittee set up a pilot to determine if it was practical for DOE to retrieve this data and eliminate the corresponding fields from the data submitted to DOE HQ for the Annual Summary. So far, four sites are submitting data and sites representing approximately 2/3 of DOE have expressed an interest in joining the pilot. The majority of DOE site fire departments are already NFIRS compatible for a variety of reasons:

- Many sites voluntarily participate through their states.

- Other DOE sites use commercial off-the-shelf fire department management software that is compatible with NFIRS
- NFIRS software provides an established and well tested format for data collection and is available free of charge. Some sites use NFIRS software as a means of saving data locally.

A few complications remain to be resolved, such as duplicate reporting to states and DOE-NFIRS but none appear to be insurmountable. The full Fire Safety Committee has endorsed implementation of an NFIRS-based system. With a sufficient variety of participants in the pilot, it should take less than a year to work out any conflicts, then DOE M 231.1-1A can be revised. There is no cost for the pilot using DOD NFIRS. However, if permanently implemented, DOE would have to execute a Memorandum of Understanding with DOD and agree to share some future development costs which are expected to be minimal. This MOU could also highlight required data fields within NFIRS and identify any unique fields required for DOE sites. The cost differential of using the DOD NFIRS rather than establishing a separate DOE NFIRS collection system or of combining the NFIRS data into the data reported directly to DOE HQ should be evaluated. A draft memo to the field soliciting participation in the pilot is attached.

DATA FOR DOE HQ: DOE HQ currently uses data on both fire protection programs and fire department responses. NFIRS does not collect program data. If DOE sites uniformly report to NFIRS, HQ can retrieve a significant part of the fire department response data from NFIRS rather than collecting it directly. This still leaves a need to collect fire program data from the sites. The data elements needed by DOE HQ to prepare an Annual Fire Summary report are listed in the attached tables. Table 1 is program related data that all sites must submit directly to DOE HQ and Table 2 is data that HQ could retrieve from NFIRS. For large sites staffed with emergency response organizations, reporting through NFIRS can be readily implemented. Smaller sites, however, do not always have emergency response forces and may not even have a permanent staff. All but one of the subcommittee members felt that DOE should have a record of all fires at DOE owned or occupied property. However, it would not be practical to provide several days of NFIRS training for a contractor hired to go to an unmanned site for a one-time task. Fires are not reported through ORPS unless they exceed certain criteria or thresholds. In order to be able to prepare a report that minimally summarizes all fire events at DOE sites, we suggest that contractors be required to submit the data in Table 2 directly to EH for any events that are not reported through NFIRS. This may include self-extinguishing fires and fires extinguished by nearby personnel. Although these incidents may not significantly change overall DOE statistics, they are important to the program offices to identify adverse trends and events.

DATA RETAINED AT DOE SITES: A significant portion of the data required by DOE M 231.1-1A is not currently used by DOE HQ. However, it is important for managing site programs and it may be needed from time to time by HQ to support investigations, special studies, or to respond to inquiries from upper management, Congress, and others. The subcommittee placed these elements in Table 3. This data should be retained at the sites in addition to data collected per NFPA 901 criteria. DOE Order 420.1A requires use of NFPA Standards but is not clear regarding expectations for NFPA guidance

documents. NFPA 901 provides guidance on types of emergency response data to be collected by emergency response organizations. DOE G 440.1-5 or another appropriate lower tier directive should address DOE expectations for this and other NFPA guidance. In particular, DOE contractors should conform to the data requirements in NFPA 901 to the extent appropriate for the site and be able to retrieve or reconstruct the data if needed. If a site uses NFIRS, most this data would already be available. Sites using modified IT&M schedules that deviate from national standards would be required to retain data as outlined in the current manual but would not be required to submit the data to HQ unless requested by upper management for a specific purpose.

ANNUAL FIRE SUMMARY: The annual fire summaries from the sites provide a wealth of valuable information but the data was not previously retrievable for use by program offices or other sites. EH-2 has recently taken steps to make current site data available on-line through the fire protection program web page. EH-2 combines selected facts from the site summaries and publishes a DOE Annual Fire Summary Report. The graphs and loss summaries are very useful in illustrating the overall performance of the DOE fire protection program, additional data analysis is needed that is site specific and more predictive of near term performance. The data elements in Tables 1 and 2 can be combined and normalized to form a number of useful measures. Annex B provides an outline with specific recommendations for performance reporting in the Annual Fire Summary. Currently EH-3, Performance Analysis, does not contribute to analysis or reporting of fire data. The report would be significantly improved if EH-3 would provide some analysis to supplement the factual data from EH-2.

TIMELINESS OF DATA: One DOE report to the DNFSB indicated that the published fire protection information is not considered timely. The subcommittee did not agree with this assessment. ORPS was found to be very timely and captures all top level fire incidents that require immediate action. The Annual Fire Summary is used primarily for historic purposes and for tracking/trending. The subcommittee believes that the Annual Fire Summary is adequate for this purpose. The time lag of approximately 8-9 months after the end of the year is consistent with other DOE safety databases. In addition, the Program offices receive daily reports from their sites that can be used to detect short term issues. Implementation of NFIRS will also allow more frequent retrieval of response data.

COMPLETENESS OF ANNUAL SUMMARY: The subcommittee found that some sites were not submitting any data for the Annual Fire Summary, others were omitting significant data, and some were screening reports of fires and sending only those that they deemed to be of significance. EH does not systematically notify program offices or site managers when sites do not submit data. It is not clear which sites are supposed to submit data since the list of Annual Fire Summary sites was derived from property records which have little relationship to staffing, fire departments or fire protection programs. The reasons for omissions should be determined and if justified, the exceptions should be indicated in DOE M 231.1-1A. Also, participants should be listed in the fire protection implementation guide or DOE fire protection web site. Some sites were not reporting certain types of fires, particularly small ones. In a few cases, incidents

that the fire protection community considers to be fires were reported in ORPS as thermal excursions, exothermic reactions, rapid deflagrations and other similar names and may not have been recognized as fires or included in the annual fire summary. DOE M 231.1-1A requires reporting of all fires. One use of the data is to support calculations on the probability of a fire igniting, so every unplanned ignition must be included even if fire does not spread. The subcommittee developed a definition of fire and submitted it for inclusion in the ORPS manual. It is recommended that this same definition be included in DOE M 231.1-1A and that the wording for the Annual Fire Summary be revised to put more emphasis on reporting all fires. The following definition was derived from ASTM standard E-176 with modifications from NFPA 901:

> *Fire. Unplanned destructive burning, including explosions (detonation or deflagration), as manifested by any or all of the following: light, flame, heat or smoke. Fire does not include the following unless they cause a fire or occur as a consequence of a fire: lightning or electrical discharge, rupture of a pressure vessel not caused by internal combustion, detonation of munitions, or overheat [without damage to initiating material.]*

HQ FIRE PROTECTION DATA PROCESSING: EH support for collection and analysis of fire protection data and access to that data is not consistent with the level of support provided for other types of safety data covered by DOE M 231.1-1A. The Annual Fire Summary has traditionally been handled by the DAS for Safety & Health, EH-2, rather than the DAS for Performance Assessment and Analysis, EH-3. Unlike other safety data required by DOE M 231.1-1A, collection and analysis of data for the fire protection program has no funding. Consequently, one fire protection program employee has had to develop software and manage the database on his own. The subcommittee is concerned that if this employee is lost to DOE, the data may also be lost or irretrievable. CAIRS, ORPS, and REMS data can be entered and retrieved on line. Fire data cannot be entered on line and retrieval capability is limited. While the current DOE site personnel know Jim Bisker and can submit data to him by e-mail, the large influx of new contractors and loss of Program Office Fire Protection Engineers as a result of DNFSB Recommendation 2004-1 will make such an informal system difficult to manage. Therefore, the subcommittee recommends that a user friendly interface for submitting and retrieving data on-line be established. In order to accomplish the above recommendations, it is essential that EH seek funding similar to that now available for other safety databases.

RECOMMENDATIONS:

1. Issue a memo to program and/or site managers inviting participation in the NFIRS pilot. (Strawman attached)
2. Develop and implement an NFIRS-based system for collection of emergency response data using of one of the following prioritized alternatives:
   - Agreement (MOU) with DOD NFIRS program (preferred method), or
   - Establish separate DOE NFIRS program with FEMA, or
   - Integrate NFIRS fields into EH data collected through DOE M 231.1-1A
3. Execute a Memorandum of Understanding with DOD if DOD-NFIRS is selected. Specify minimum fields requiring completion and any unique data fields for DOE.

4. Revise DOE M 231.1-1A to specify site data retention guidance and to require the following fire data be reported to HQ:
    - Table 1 to replace current annual fire summary data required by DOE M 231.1-1A. (Note that one line descriptions require additional definition as in the current manual.)
    - NFIRS data through the system selected in Recommendation 2. Alternatively, for any emergency response not reported through NFIRS, the data in Table 2 should be reported directly to EH - this applies primarily to sites/contractors that do not have an emergency response organization.
5. Revise DOE G 440.1-5 to establish DOE expectations for use of NFPA recommended practices and guidance publications.
6. Revise format for DOE Annual Fire Summary report to include as a minimum the information in the outline attached as Annex B to this report
7. EH-3 should prepare a performance analysis to identify trends and lessons for inclusion in the Annual Fire Summary report issued by EH-2. (A contracted entity as the Navy Safety Center or an intern from a fire protection engineering college could support EH-3.)
8. Identify which DOE sites and contractors should report data for the Annual Fire Summary. Add any exceptions to DOE M 231.1-1A
9. Notify program office or site managers of sites that fail to submit reports required by DOE M 231.1-1A
10. Define “fire” to be more inclusive in ORPS and Annual Fire Summary
11. Fund DOE fire protection data collection and analysis to support:
    - On-line data entry
    - User friendly data retrieval
    - Analysis of performance
    - Preparation of Annual Fire Summary report

ANNEX A

TABLE 1. DATA REPORTED TO HQ BY ALL SITES

Annual Summary Fire Events >$50K

- Date
- Location
- Description
- Dollar loss
- Injury involved
- Suppression system involved
- Cause
- Actions to prevent recurrence
- Fire Type (Bldg, brush, vehicle, other)
- Method of Extinguishment
- Report(s) number in ORPS, CAIRS, NFIRS, etc.

Major Equipment Purchases (*over $10,000*)

- Description
- Cost

Fire Program Highlights/Accomplishments

- Date
- Location
- Description

Fire Protection Systems

- Number Sprinkler Systems (risers) NFPA 13 Systems
- Number of other water-based systems
- Number fixed Halon Systems (NFPA 12A)
- Quantity of Halon in active systems (Pounds)
- Number Clean Agent Systems
- Number Carbon Dioxide Systems
- Number Fire Detection and/or Alarm Systems (NFPA 72)
- Failure rates for sprinkler, other water, detection and alarm, non-water based systems
- Number of detection/suppression system impairments
- Number of detection/suppression systems impaired more than 30 days

Assessments/FHAs

- Date Last Federal FP Program Assmt of Each Contractor
- Date Last Self-Assessment of Federal FP Program
- Date Last FP Program Self-Assmt by Each Contractor
- # FHAs required
- # FHAs current
- # Facility Fire Assessments Required
- # Facility Fire Assessments Current
- Assessment Findings Beginning of Year

- Assessment findings closed fm prior year
- Assessment findings added since prior year

Staffing

- # DOE FP staff qualified FPE
- # Contractor FP staff qualified FPE
- # Subcontractor FP staff qualified FPE
- Does Contractor staffing meet BNA

Average response time

- Fire
- Medical

Describe approved IT&M deviations (exemption/equivalency)

TABLE 2. DATA RETRIEVED FROM NFIRS (SUBMITTED WITH ANNUAL SUMMARY IF NOT REPORTED TO NFIRS)

Number of Emergency Responses

- Fire
- Medical
- HAZMAT
- Other Emergencies
- Mutual Aid Received
- Mutual Aid Provided

Fire Events

- Date
- Location/building
- Description of event
- Response organization(FDID, fire brigade, employee, operator, etc.)
- Acres burned if wildland fire (contaminated?)
- Dollar loss
- Injury involved – identify affiliation
- Suppression system involved
- Release/ignition sequence if HAZMAT involved
- Cause
- Fire Type (Bldg, brush, vehicle, other)
- Method of Extinguishment

Suppression System Actuation (with or without fire)

- Date
- Suppression system type
- Location
- Description
- Cause
- Cost of damage/agent
- Injuries
- Quantity released/number of sprinklers operating
- If false operation or failure, identify reason
- Remedial actions

Injuries (Obtain through CAIRS)

TABLE 3. FIRE PROTECTION DATA RETAINED IN FIELD

Fixed Halon Systems

- Number Removed
- Number Added
- Quantity Removed
- Quantity Added
- Quantity Imported
- Quantity Exported
- Bank Deposit
- Bank Withdraw
- Quantity Sold
- Quantity Bought

Recurring Costs

- FD Medical
- FD Training
- Outside Services
- FP Engineering

IT&M Information For Each System/Equipment Listed

1. **Number of systems/equipment**
2. **Number inspected**
3. **Number of failures**
4. **Type of failure (control valve closed, insufficient pressure volume, device failure, supervisory device, detection, etc.)**

- Wet Pipe Sprinkler System
- Dry Pipe Sprinkler Systems
- Wet Pipe Sprinkler Systems(anti-freeze)
- Deluge Sprinkler Systems
- Preaction Sprinkler Systems
- Foam Sprinkler Systems
- Water Spray Systems
- Halon 1301 Systems
- Halon 1211 (fixed) Systems
- Clean Agent Systems
- Wet Chemical Systems
- Dry Chemical Systems
- Carbon Dioxide Systems
- Manual (fixed) water app Systems
- Water Tanks
- Fire Pump Systems
- Fire Service Mains/hydrants
- Central Fire Alarm Systems
- Emergency Notification Systems
- Local Alarm Systems
- Manual Stations
- Fire Doors/Windows
- Fire/Smoke Dampers
- Smoke/Heat Vents
- Exit Doors
- Emergency Lights

- Exit Signs
- Fire Detection Systems

DOE Program Activities

- Last FP Program Assessment: Issues Assessed (Fed)
- Last FP Program Assessment: Outcome (Federal)
- Last FP Program Self-Assmt: Issues Assessed
- Last FP Program Self-Assessment: Outcome

Comprehensive FP Program (each contractor)

- FP Program documents updated w/in 3 years
- FP Program Assessments complete
- FP Program Assessments current
- FPE staff qualified
- All FP systems IT&M current
- Fire Alarm statistics current
- Fire system failures tracked
- Maintenance technicians qualified

Fire Department/Brigade

- Fire Response meets BNA
- BNA addresses NFPA 1710
- Staffing meets BNA
- Emergency response personnel qualified per BNA
- Pre-plans complete and current
- FD program documents complete and current
- Apparatus/equipment provided per BNA
- Apparatus/equipment maintained
- Emergency communication equipment functional
- FD operational data current and accurate

All NFIRS/NFPA 901 Data Per Site Plan

ANNEX B

Proposed information to be reported in Annual Fire Summary

Note: This outline suggests items that should be part of the DOE annual fire summary report prepared by DOE Headquarters based on input from the field offices.

- Forward
- Glossary
- Definitions
- Executive Summary – Include program accomplishments and highlights (e.g. the national HPR loss rate is $0.xx/dollar and DOE loss rate is $0.xx/dollar; compare national/NFIRS data and discuss how successful the program actually is. Add some analysis of the results.
- DOE Loss Experience
    - Number of incidents
        - Building/Structure
        - Wildland
        - Other
    - Large (over $50,000) and Significant Fire Incidents (Narrative of each event.)
    - DOE Loss History from 1950 to Present
    - Figures
        - DOE Property Valuation
        - Property Loss
        - DOE Loss Rate
        - Fire Incidents by Field Organization
        - Fire Loss Amount by Field Organizations
- Fire Department Activities and NFIRS Data
    - Number of Responses
        - List fire, HAZMAT, medical, other emergency, non-emergency, mutual aid separately
        - Average Response Time per Response - Fire
        - Average Response Time per Response - Medical
        - Average Number of Personnel Responding
    - Major Equipment Purchases (Over $10,000)
- Facility Fire Protection Assessment and Fire Hazard Analysis Performance Data
    - Number FPAs required

- Number FPAs current
- Number FHAs required
- Number FHAs current
- Number of FHA's Maintained in DOE Complex (Nuclear, Radiological, Other)
- Figure of FHA Completions per Field Office

- Performance Indicator Summary
  - Water Based Fire Suppression System Performance
    - Water Based System Actuations
    - DOE Historical Automatic Suppression Performance, 1955 to Date of Report
  - Non-water Based Fire Suppression System Performance
    - Non-water Based Fire Suppression System Actuations
  - Summary per field office (one summary chart per field office)

- Inspection, Testing and Maintenance Completion Data
  - Numbers Performed and Failure Rates
    - Sprinkler suppression systems
    - Other water-based suppression systems
    - Fire Detection and Alarm
    - Non-water based suppression systems
  - Number of detection/suppression system impairments
  - Number of detection/suppression system impairments lasting more than 30 days
  - Summary of Approved Exemptions for Deviations to ITM criteria

- Fire protection technical staffing
  - Number of operating contractor qualified FPEs each site
  - Number of sub-contractor qualified FPEs each site
  - Number of Federal qualified FPEs each site

- Conclusions

ANNEX 3

MEMO FROM EH

DATE

SUBJECT: Participation in Pilot of the National Fire Incident Reporting System

TO: Distribution

DOE has established a voluntary pilot program to test use of the National Fire Incident Reporting System (NFIRS) as the primary source of fire and emergency response data that is currently required by DOE M 231.1-1A. The national database known as NFIRS is compiled by the US Fire Administration, which is part of the Federal Emergency Management Agency. Fire department participation is required by most states. Many DOE sites currently participate in NFIRS through their states while other sites generally use compatible commercial off-the-shelf fire department management software or free NFIRS data management software to generate incident response logs.

Site data submitted through states is not readily retrievable from the national database. However, the Department of Defense (DOD) has offered use of its system where DOE data would be retrievable. DOD facilities throughout the world participate in NFIRS but their data, which is for official use only, is segregated from the national database so there is no conflict with duplication of data uploaded to states.

I ask that you notify emergency response organizations at your sites of this voluntary program and encourage participation. DOE sites have a variety of fire department and other emergency response arrangements. It is essential that we test as many different arrangements as possible during the pilot so that any conflicts can be avoided if NFIRS is implemented by DOE. The DOE point of contact is Jim Bisker, EH-22, 301-903-6542.

Distribution: All PSOs and Field Element Managers.